Addressing Bitrate and Latency Requirements for Connected and Autonomous Vehicles

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FONDAZIONE BRUNO KESSLER

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5G-EmPOWER
Mobile Network Operating System

Heterogeneous RANs
5G-EmPOWER supports Wi-Fi and LTE RANs. The OpenEmpower Protocol enables remote management of heterogeneous RAN elements.
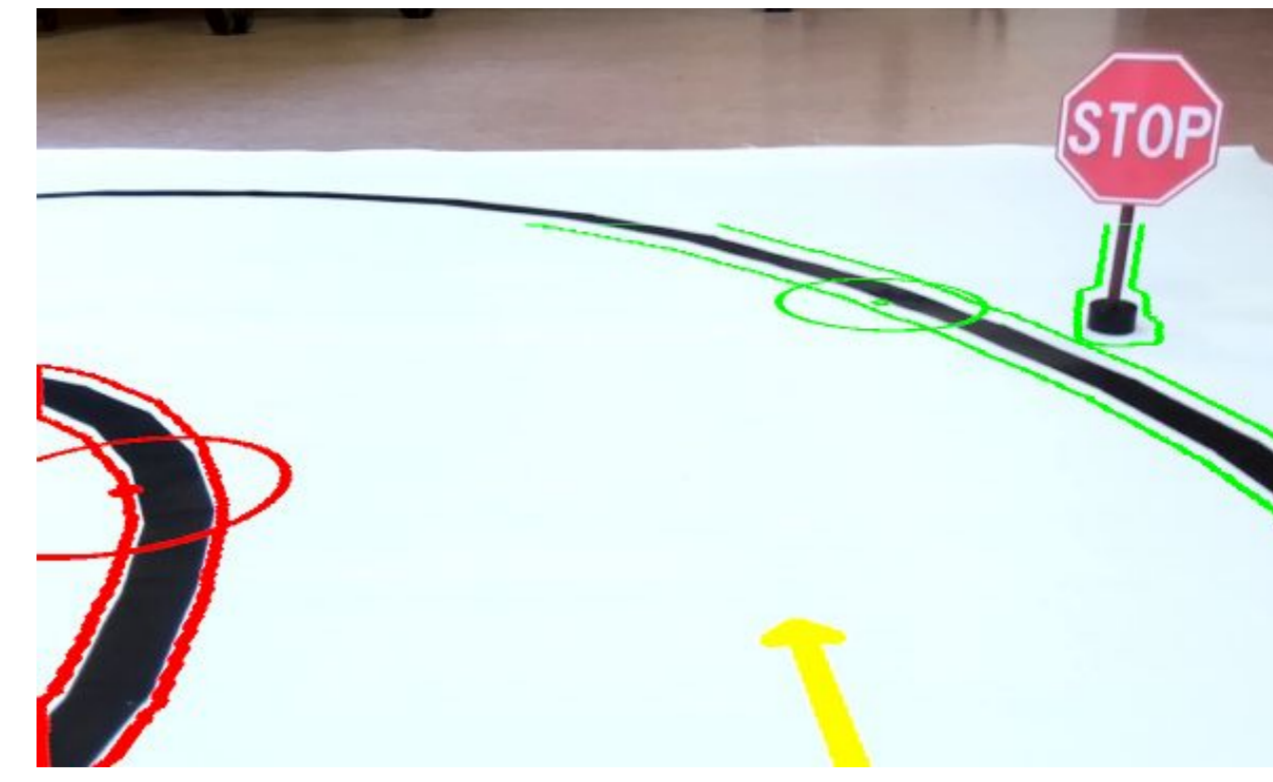
5G-EmPOWER SDK
Network service programmability is enabled through an intent-driven application framework.
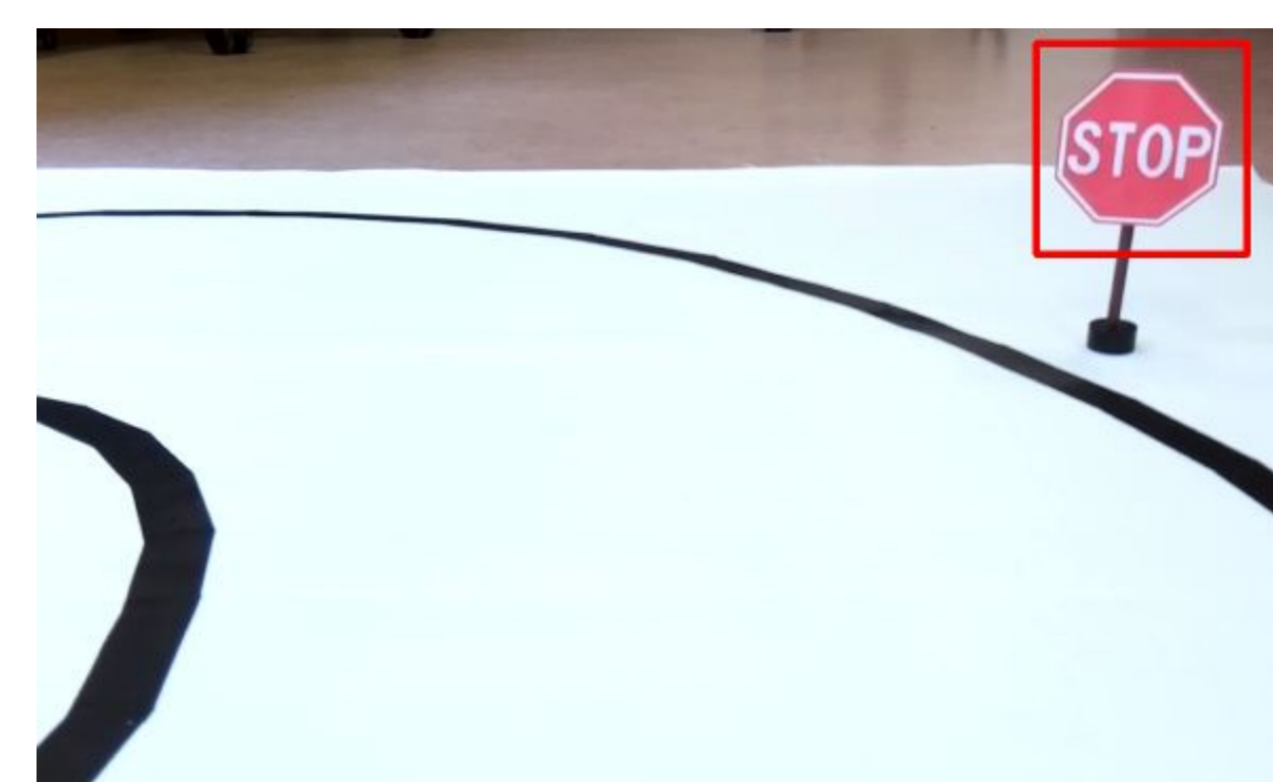
Active Slicing
Deploy custom resource allocation schemes within a network slice.

Road Data Processing (RDP) Application

Lane Line Detection
Determines the path to ensure safe and cooperative maneuvering. Building on OpenCV, images are transformed to detect the road lines and calculate the path to follow.

On-Road Object Detection
Identifies traffic signs for use cases such as emergency braking. A Haar feature-based cascade classifier is trained offline building on the features extracted from a set of positive and negative images.

MEC and Cloud Computing in the Connected Vehicles Ecosystem

The reference network architecture builds upon the 5G-EmPOWER platform, which coordinates the operations of the radio access node.

The ME host is between the access node and the EPC following a bump-in-the-wire approach. Open vSwitch is in charge of the traffic routing, while a Click process is responsible for its analysis.
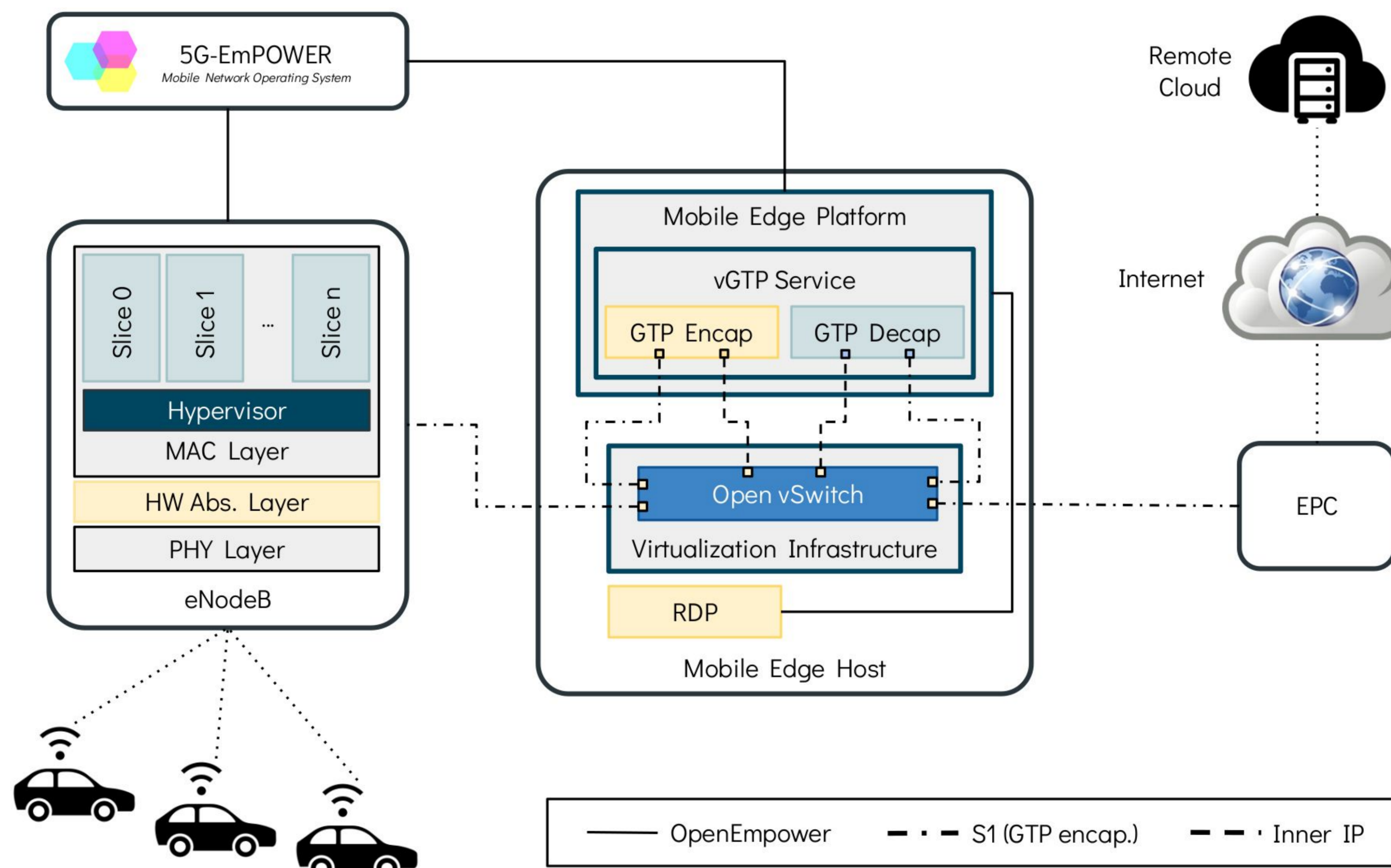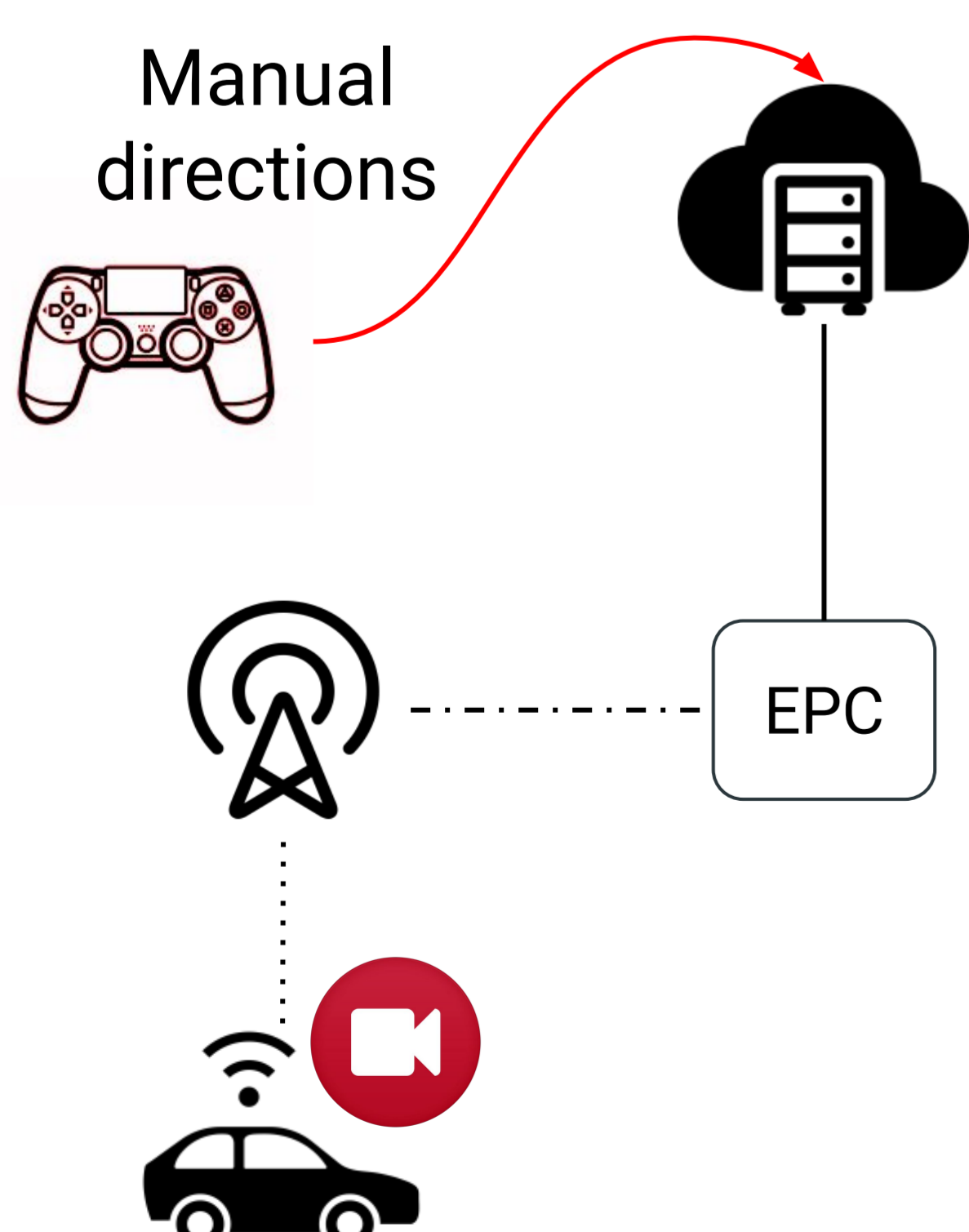

The RDP App can be deployed in the ME host or in a cloud data center.
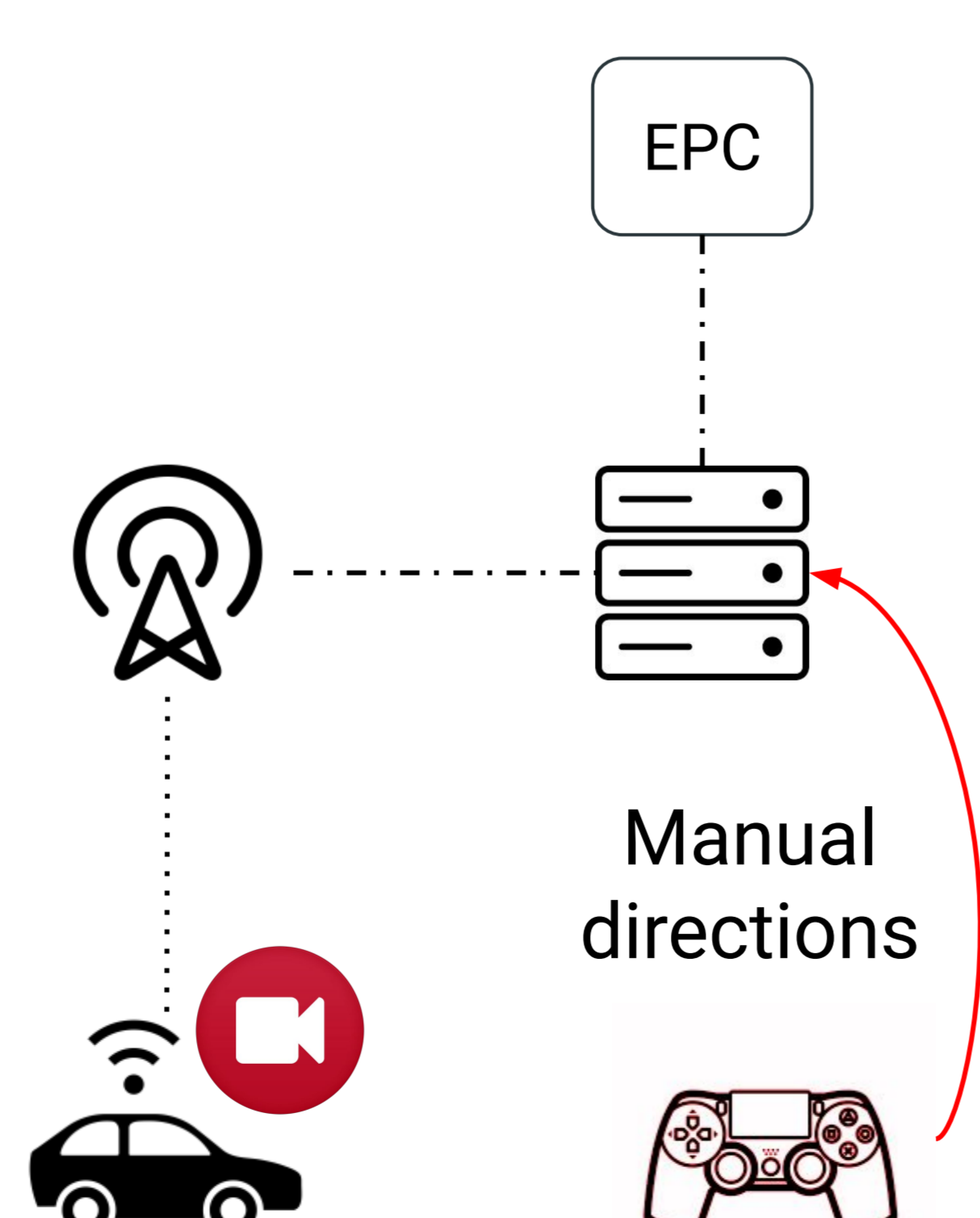
The RDP App processes the video stream fed by the vehicles and sends back the corresponding instructions.

Alternatively, vehicles can be driven manually emulating remote driving.
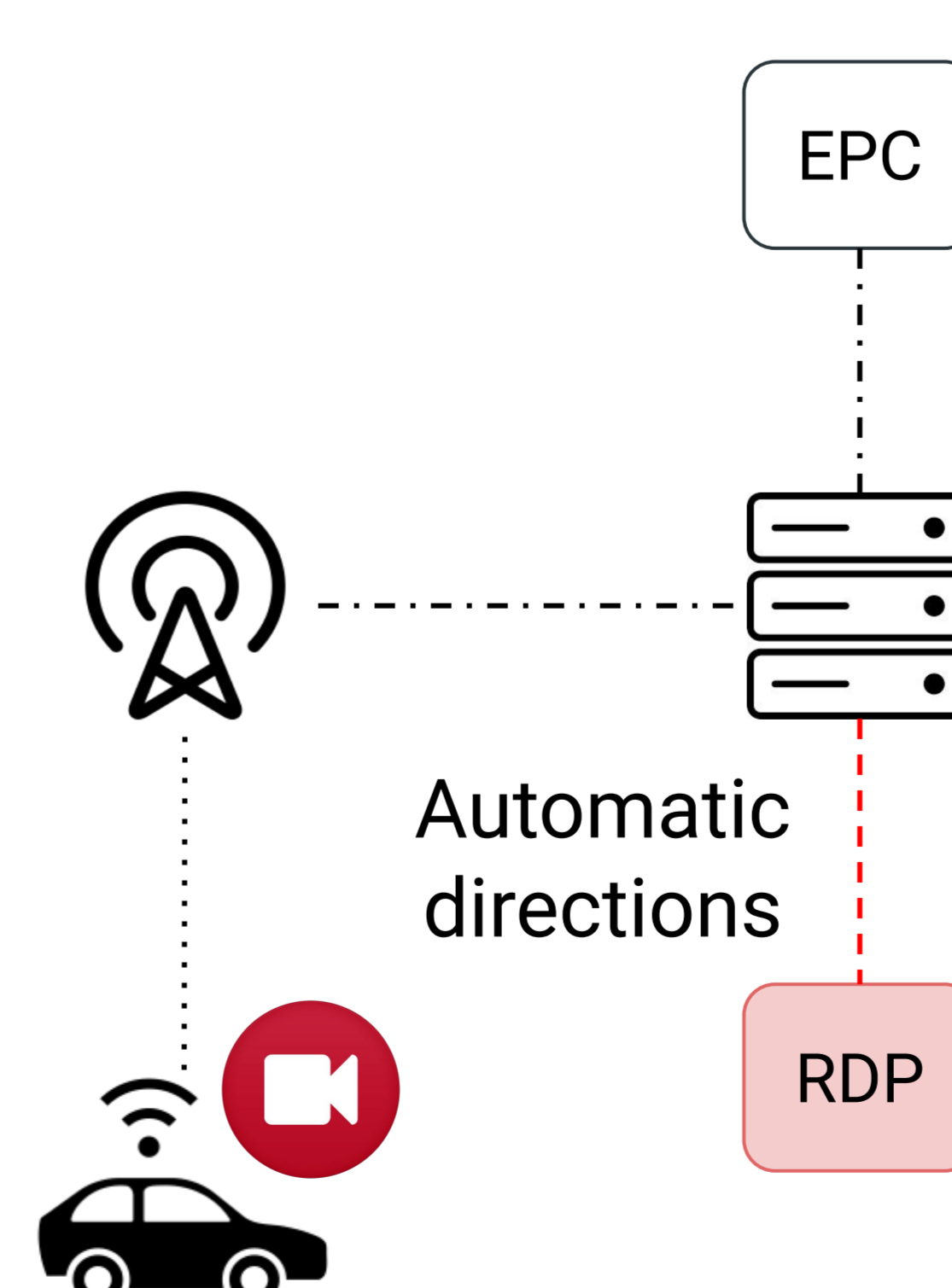
1 Cloud-based Remote Driving
Manual directions

2 MEC-based Remote Driving
Manual directions

3 MEC-based Autonomous Driving
Automatic directions

4 Cloud-based Autonomous Driving
Automatic directions

5G CARMEN

European Commission